

CLAIMS

1. An apparatus adapted for a wireless communications supporting Large Area Synchronized-Code Division Multiple Access (LAS-CDMA) transmissions, the transmissions using LS codes for spread-spectrum modulation, the apparatus comprising:
 - means for determining a size of an interference free window (IFW);
 - means for calculating a plurality of subsets of LS codes, each subset comprising a number of LS codes as a function of the IFW;
 - means for assigning a first of the plurality of subsets to a first portion of the system; and
 - means for assigning a second of the plurality of subsets to a second portion of the system.
2. The apparatus of claim 1, wherein the means for calculating further comprises:
 - means for determining a number of subsets for application within the system;
 - means for determining the first subset of LS codes having null cross-correlation with respect to each other; and
 - means for determining the second subset of LS codes having null cross-correlation with respect to each other.
3. The apparatus of claim 1, further comprising:
 - means for identifying mobile stations within the first portion of the system with LS codes from the first of the plurality of subsets; and
 - means for identifying mobile stations within the second portion of the system with LS codes from the second of the plurality of subsets.
4. The apparatus of claim 1, wherein a cross-correlation of the LS codes within the first and second of the plurality of subsets is null within the IFW.
5. The apparatus of claim 1, wherein the size of the IFW corresponds to an LS code length, and wherein means for calculating the plurality of subsets further comprises:
 - means for generating seed pairs given as:

(C1; S1); and

(C2; S2); and

means for generating a plurality of LS codes of the LS code length by application of a formula given as:

$$\begin{array}{l} (C1 \quad C2; \quad S1 \quad S2) \\ (C1 \quad -C2; \quad S1 \quad -S2) \\ (C2 \quad C1; \quad S2 \quad S1) \\ (C2 \quad -C1; \quad S2 \quad -S1), \end{array}$$

wherein a negative indicates a binary complement of an original element.

6. The apparatus as in claim 5, further wherein the number of subsets is at least three.

7. An apparatus adapted for use in a Large Area Synchronized-Code Division Multiple Access wireless communication system, the apparatus comprising:

means for transmitting a first communication within a first cell, the first communication identifying at least one mobile station within the first cell by a first LS code within a first subset of LS codes; and

means for transmitting a second communication within a second cell, the second communication identifying at least one mobile station within the second cell by a second LS code within a second subset of LS codes;

wherein a cross-correlation between any two LS codes within the first is null within an interference free window, and the cross-correlation between any two LS codes within the second subset is null within the interference free window.

8. The apparatus of claim 7, wherein the first and second subsets of LS codes are part of a set of LS codes defined by the interference free window.

9. The apparatus of claim 8, wherein for the set of LS codes comprises 128 codes, the interference free window equal to $[-1, +1]$ corresponds to 64 available codes for forming subsets.

10. The apparatus of claim 9, wherein a correspondence between the interference free window and a number of available codes for forming subsets is based on an arborescence structure.